

WHAT IS CLAIMED IS:

1. A light diffuser comprising a thermoplastic layer incorporating organic bead-containing microvoids and having an integral smoothing layer on at least one surface thereof, the smoothing layer exhibiting an average thickness less than 12 microns.

2. The diffuser of claim 1 having a substantially circular cross-section in a plane perpendicular to the direction of light travel and having a light transmission efficiency of at least 80%.

3. The diffuser of Claim 1 wherein said integral smoothing layer comprises polyester polymer.

4. The diffuser of Claim 1 wherein said integral smoothing layer comprises polyolefin polymer.

5. The diffuser of Claim 1 wherein said smoothing layer has an average thickness between 2 and 12 micrometers.

6. The diffuser of Claim 1 wherein said smoothing layer is contained on both external layers.

7. The diffuser of Claim 1 wherein said smoothing layer further comprises a layer of pressure sensitive adhesive applied to the surface of the smoothing layer.

8. The diffuser of Claim 1 wherein said smoothing layer has a average surface roughness of between 0.02 and 0.18 micrometers.

9. The surface diffuser of Claim 1 wherein said smoothing layer has a % light transmission of between 94 and 99.6%.

10. The surface diffuser of Claim 1 wherein said smoothing layer contains a cross linked urethane polymer coating applied to the surface of the smoothing layer.

11. The light diffuser of Claim 1 wherein the difference in refractive index between the thermoplastic polymeric material and the microvoids is greater than 0.2.

12. The light diffuser of Claim 1 wherein said microvoids are formed by organic microspheres.

13. The light diffuser of Claim 1 wherein said microvoids are substantially free of scattering inorganic particles.

14. The light diffuser of Claim 1 wherein the microvoids contain cross-linked polymer beads.

15. The light diffuser of Claim 1 wherein the microvoids contain a gas.

16. The diffuser of Claim 1 where thickness uniformity across the light diffuser is less than 0.10 micrometers.

17. The light diffuser of Claim 1 wherein the elastic modulus of the light diffuser is greater than 500 MPa .

18. The light diffuser of Claim 1 wherein the impact resistance of the light diffuser is greater than 0.6 GPa.

19. The light diffuser of Claim 1 wherein said light transmission is greater than 80%.

20. The light diffuser of Claim 1 wherein said light transmission is greater than 87%.

21. The light diffuser of Claim 1 wherein said microvoids have a major axis diameter to minor axis diameter ratio of less than 2.0.

22. The light diffuser of Claim 1 wherein said microvoids have a major axis diameter to minor axis diameter ratio of between 1.6 and 1.0.

23. The light diffuser of Claim 1 wherein said thermoplastic layer contains greater than 4 index of refraction changes greater than 0.20 parallel to the direction of light travel.

24. The light diffuser of Claim 1 wherein said microvoids have a average volume of between 8 and 42 cubic micrometers over an area of 1 cm².

25. The light diffuser of Claim 1 wherein said microvoids have a average volume of between 12 and 18 cubic micrometers over an area of 1 cm².

26. The light diffuser of Claim 1 wherein the said light diffuser has a thickness less than 250 micrometers.

27. The light diffuser of Claim 1 wherein the said light diffuser has a thickness between 12.5 and 50 micrometers.

28. The light diffuser of Claim 1 wherein said thermoplastic layer comprises polyolefin polymer.

29. The light diffuser of Claim 1 wherein said thermoplastic layer comprises polyester polymer.

30. The light diffuser of Claim 5 wherein said organic beads have a mean particle size less than 2.0 micrometers.

31. The light diffuser of Claim 5 wherein said organic beads have a mean particle size between 0.30 and 1.7 micrometers.

32. A back lighted imaging media comprising a light source and a light diffuser comprising a thermoplastic layer incorporating organic bead-containing microvoids and having an integral smoothing layer on at least one surface thereof, the layer exhibiting an average thickness less than 12 microns.

33. A liquid crystal device comprising a light source and a light diffuser comprising a thermoplastic layer incorporating organic bead-containing microvoids and having an integral smoothing layer on at least one surface thereof, the layer exhibiting an average thickness less than 12 microns.

34. A liquid crystal device component comprising a light source and a light diffuser comprising a thermoplastic layer incorporating organic bead-containing microvoids and having an integral smoothing layer on at least one surface thereof, the layer exhibiting an average thickness less than 12 microns wherein said smoothing layer is in optical contact with a brightness enhancement film.